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Korsgaard, Maren

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Strategic irrigation against apple scab (*Venturia inaequalis*)



Maren Korsgaard, AGRECO, University of Copenhagen, Denmark. mkor@life.ku.dk

Introduction

Prevent apple scab with water?

In Denmark there are several organic orchards, that do not spray at all, and they seek non-spraying methods to prevent apple scab.

In this pilot trial, irrigation with water at strategic moments was tested to prevent scab-infection.

The idea was to empty the stock of ascospores during dry spells, so they would dry out without infecting the leaves.

Hypothesis

Take advantage of dry springs

Ascospores of *Venturia inaequalis* are normally released from the old leaves on the orchard floor and infecting the young apple leaves during humid periods.

The ascospores will react after a rain fall of only 0,2 mm. If the ascospores then are left dry, they will die within 10-14 hours.

These facts gave the idea to utilize dry spells in spring to empty the stock of ascospores.

By irrigating the floor only, without wetting the trees, the ascospores should die out and never cause infection.

Materials and methods

Five test-orchards

The strategic irrigation was carried out in April-June 2011 in five organic orchards. The orchards was situated in different climate-regions in Denmark.

In three of the orchard, we put up sprinklers to irrigate the orchard floor.
In two orchards, the growers used at homebuilt water wagon.

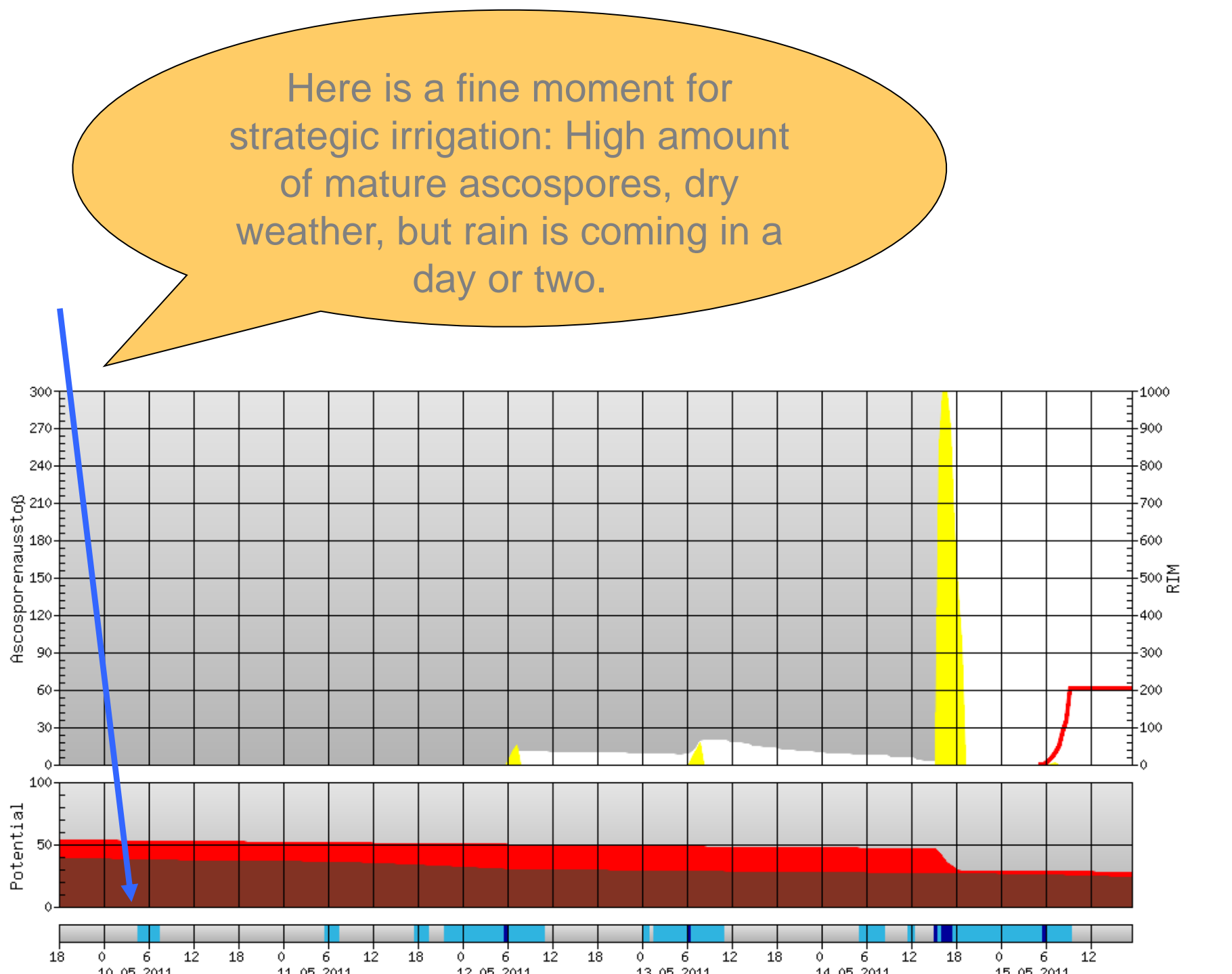


Showers in the morning

The fruit growers decided when to irrigate. The decision was based upon Rimpro and the local weather forecast.
A good choice for strategic irrigation is when:

- Rimpro shows a great amount of ripe ascospores,
- the weather is dry and
- rain is forecasted the following day.

The irrigation took place in the mornings, to secure at least 12 hours of dryness.



Measurements

The trials were conducted in 6 rows of apples.
In the orchards with sprinklers, we irrigated every other plot of 15m row.

In the two orchards with water wagon the 6 rows were either irrigated or not irrigated.

The degree of scab attack on the leaves and on the apples got registered in July on 5 trees in the middle of every plot. The infection level on the apples got registered again in September, right before harvest.

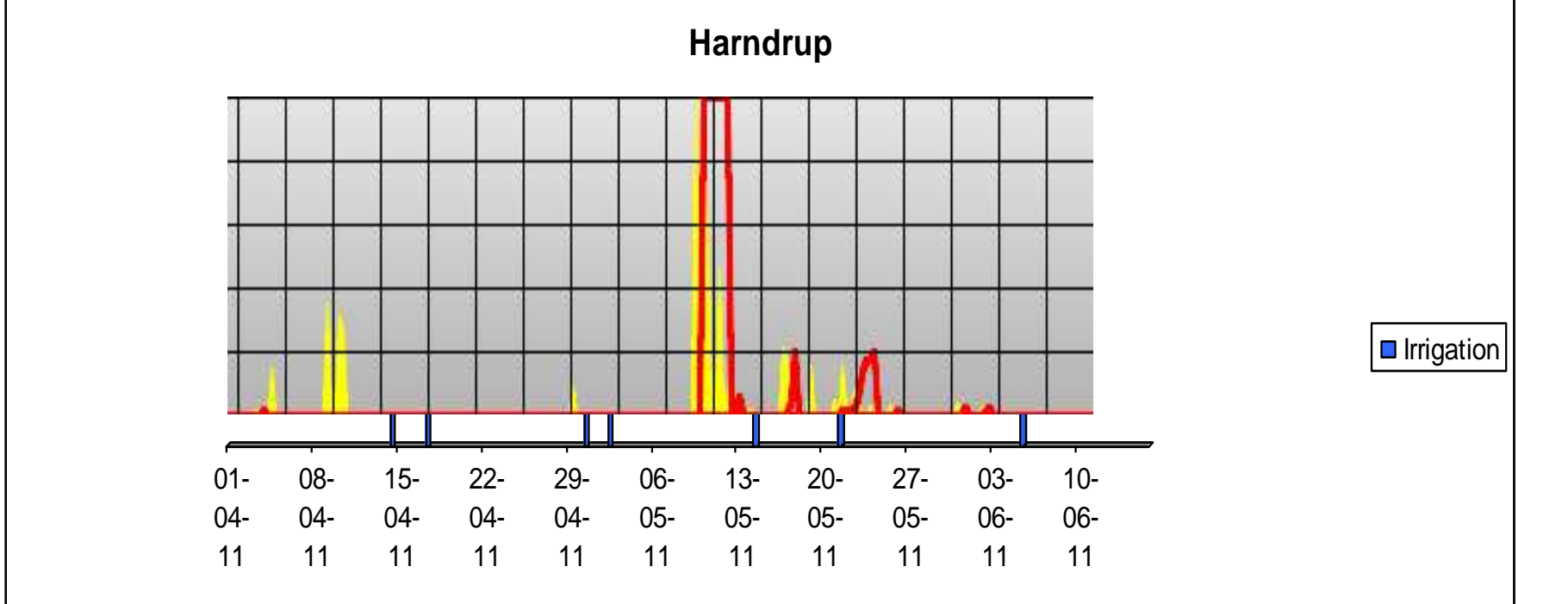
The release of ascospores got registered in a spore trap in April, to test if the ascospores did react to the irrigation.

Results

No signifiance, but a strong tendency

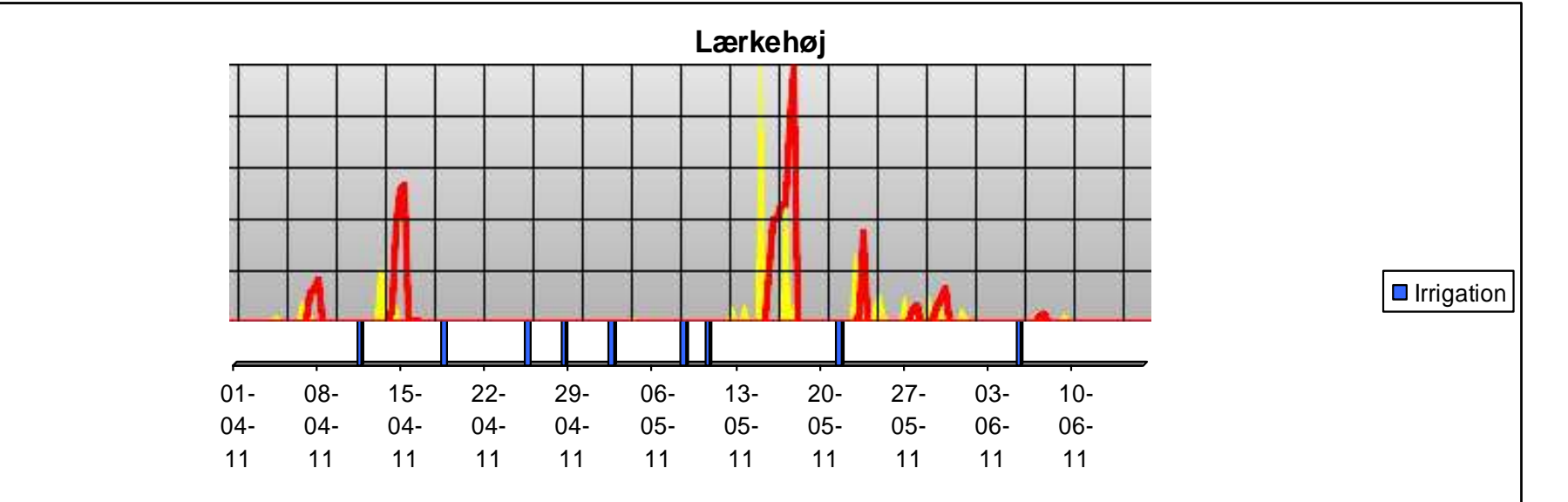
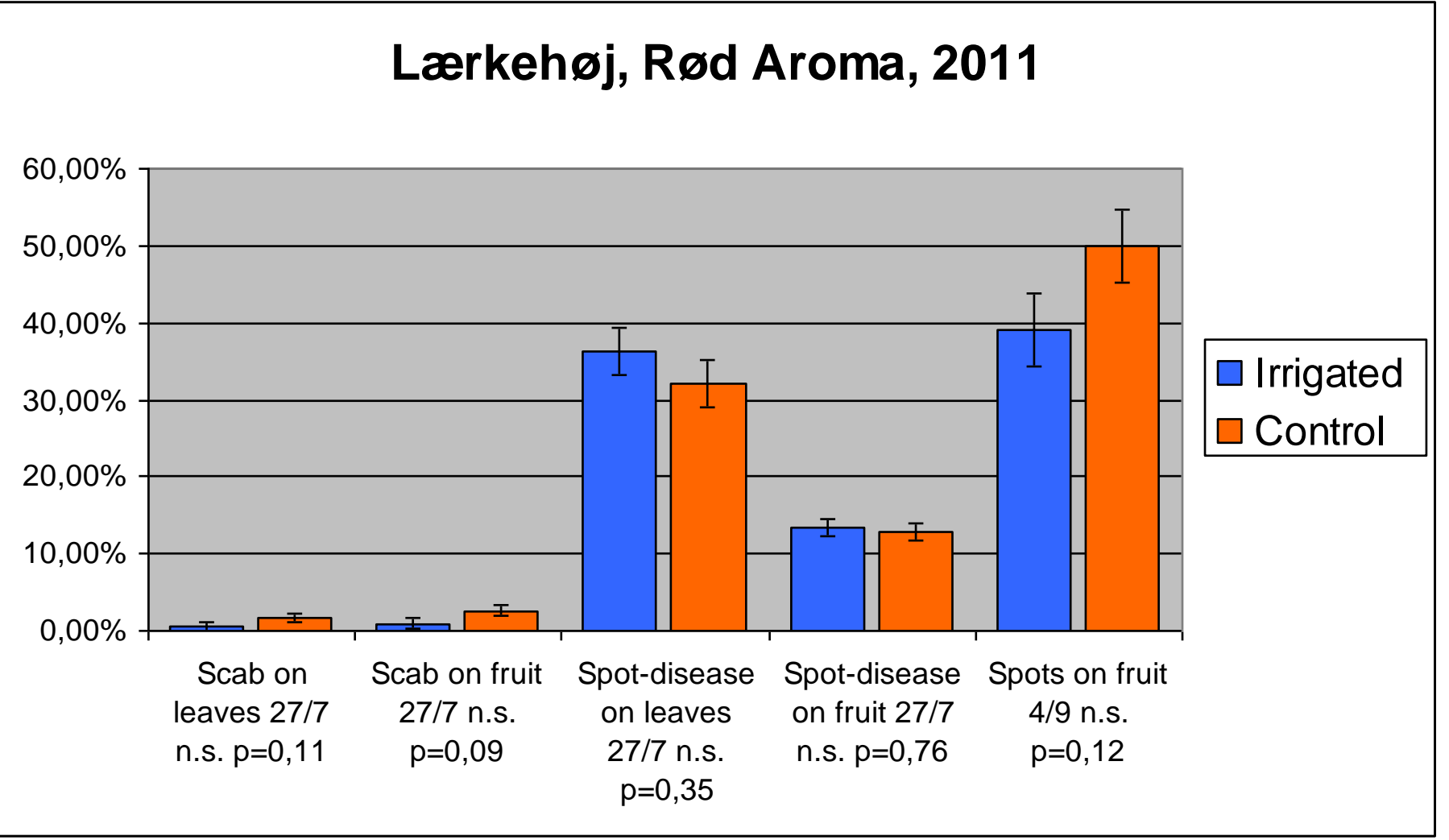
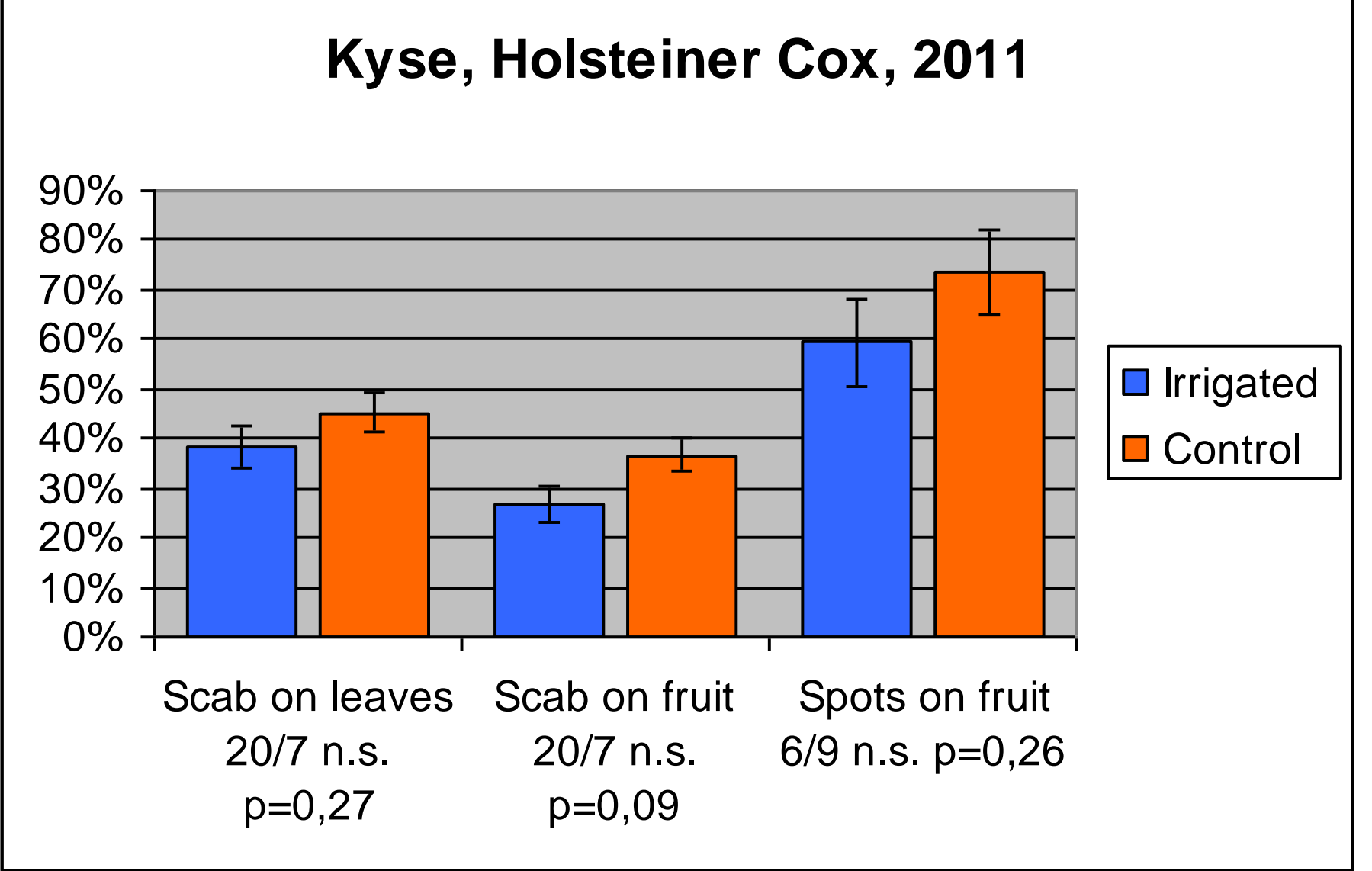
There was less than 1% scab in orchard nr. 4 and 5. These orchards had a very dry spring, and in both of the orchards sulphur sprays were also used to control scab.

As you see in the figure from the orchard “Harndrup”, there was only one severe infection period in 2011.



In orchard “Kyse” and “Lærkehøj” there was a tendency to a small positive effect of the irrigation, but the level of scab rose very fast in July and August, while the weather turned extremely wet.

39 - 74 % of the apples had spots in September in these orchards. The spots were caused by both scab and an undefined “spot disease”.



The irrigation of the orchard floor did result in ascospore-release, this was confirmed by counting ascospores in a spore trap.



Discussion

The strategic irrigation against apple scab did actually provoke the ascospores to be released. But the method has to be improved to gain a satisfactory effect.

The limitations of the method got clear in 2011: If scab is not completely prevented at midsummer, a following wet summer will result in a too heavy scab attack on the fruit.

It is also a question how much impact conidiospores from neighboring areas are having on the late scab attack.

It is important to find a technical design, which works fast and easy and covers the whole orchard floor. We will work on improving the technical design in 2012 and also work with higher amounts of water.